TCS 1260/67
9 January 1967
Copy No. 1

MEMORANDUM FOR: Chief, Technical Development Staff, NPIC

25X1A ATTENTION : [redacted]

SUBJECT : Response to Internal Requirement Under
NPIC Project No. 99738-6

1. This memorandum is in response to subject requirement requesting a review of several contract proposals on crop yield studies. The following contract proposals were reviewed and recommendations are made with regards to a PAG judgement of their respective technical approaches. An alternate recommended solution follows the evaluations. The order in which they are listed does not indicate their final rating:

25X1A a. [redacted]

Their stated approach to include reviewing the available materials and contacting experts in the field is a normal approach for scientific investigation and would probably be done by any company working the contract. It is doubtful that suitable photography on agriculture is available at the listed agencies. PAG would not recommend this contractor.

25X1A b. [redacted]

This company has some experience in related fields. Its decision to use photography from existing sources would probably not be satisfactory. Their approach is reasonable; however, sample areas would have to be carefully selected. Areas such as [redacted] would probably not be satisfactory due to the smaller size of available plots as opposed to the larger plots in a single crop area. PAG would not recommend this contractor, however it would be acceptable; if changes were made in the location of their sample areas. 25X1A

25X1A c. [redacted]

The sample area selected is unsatisfactory ([redacted] for 25X1A
reasons previously mentioned. Their general approach to the problem is satisfactory. PAG would not recommend this contractor, however with some changes this approach could be acceptable.

25X1A d. [redacted]

Their use of existing photography over test plots may give them some indication but it is believed that test plots are generally too small to derive photographic yield data. Their approach places

25X1D [redacted]

25X1D [redacted] Although this firm appears quite qualified PAG would not recommend them as it is doubtful that their solutions would be applicable to KEYHOLE materials.

25X1A e. [redacted]

This company is vague in the actual indicators it would seek. As previously cited it would probably not find the necessary photography in existing files. Its area analog approach seems valid. PAG would not recommend this contractor, however it would be acceptable.

25X1A f. [redacted]

The similar objects approach may have some promise but the proposal is a bit vague in specifics. PAG would not recommend this contractor.

25X1A g. [redacted]

The possibility of crop identification and yield prediction through use of microdensitometer is certainly worth trying. PAG has used and is investigating this technique, however on a very limited basis. The

25X1D [redacted]
25X1D [redacted] PAG would consider this proposal one of the most promising, however numerous modifications should be made.

25X1A h. [redacted]

This program could result in techniques applicable to existing operational photography. It is lacking in that it provides information after the fact and would not provide good before harvest estimate, however it is well within the state of the art.

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2. Of the proposals reviewed PAG would recommend [redacted] as most nearly qualified for this project. The program should be modified to use, KEYHOLE materials (1)/as well as, whereever feasible, project [redacted] 25X1A
25X1A [redacted] materials (2)/and generally limit itself to black and white [redacted] 25X1D
25X1D [redacted] Other materials may show more promise but may not be available as operational photography. An alternate solution to the problem would be to conduct an inhouse project to develop techniques of yield prediction. An outline project for such a project is included as Attachment I.

(1)/ It is understood that resolution targets are generally emplaced in the midwest for each mission. The area around these targets would probably be in agriculture and thus offer one source of crop analysis photography.

25X1D (2)/ High altitude [redacted] has been obtained or is planned over agricultural areas in the south and midwest. A copy of this should be made available.

3. Prior to supporting any contractor or extensive inhouse effort on this subject the PAG would suggest that a definitive statement of requirements be obtained from either or both CIA and or DIA. The PAG has been able to respond to all stated requirements for crop analysis in the past and may not require contractor assistance to respond to future requirements. In any case no contract should be undertaken without a clear statement of potential user requirements in writing followed by analysis of that requirement by NPIC PI elements to determine those areas which require further research.

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[redacted]

Colonel, USA
Assistant for Photographic Analysis, NPIC

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PRELIMINARY PROJECT OUTLINE
FOR CROP ANALYSIS EVALUATION

1. Personnel

Three photo interpreters of suitable background, i.e. PI experience and a good knowledge of farming practices, should be assigned in support of this recommended program. It is estimated that associated costs could be realized for a fraction of the monies designated in the NPIC budget for a contract dealing with crop yield prediction. It would be desirable that 100% of their time would be applied to this project for expediency and continuity, however, it could be worked in a manner similar to present third phase exploitation (subsequent to priority first/second phase reporting).

2. Materials and Data

a. Photographic materials for this program could be drawn from a variety of sources. Perhaps the areas around resolution targets, which PAG understands are emplaced for each mission (generally in [redacted] could be used for study and the system programmed to provide suitable [redacted]

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25X1A b. Photography from Project [redacted] should be made available. Also arrangements for the DOD to acquire high altitude training photography over selected/designated plots should be made. It is estimated that photography would probably not be suitable for a complete study, however, the Department of Agriculture has some materials now which would be of use. Ground truth should and would have to be obtained through the Department of Agriculture, CIA's office of contacts and/or by the working group.

3. Methodology

a. The project solution could be approached from two directions simultaneously. The correlation of items and factors, other than the crop image, that are associated with agriculture, as well as the crop image, should be investigated to develop techniques of yield estimation.

b. The former approach should concentrate on such items as storage and transportation facilities, time and rate of planting, harvesting type equipment and farming method used; crop residue, i.e. straw, as well as other indicators evolving and considered to be of significant value. A search for indicators would be concentrated in areas where ground truth is available, and to include open countries, as well as closed countries photographic reconnaissance collections, i.e. the Russian wheat failure of 1963.

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25X1D [redacted] coupled with a photographic interpretation and densitometry analysis phase. It is recommended that this program be carried out over a three year period to insure complete as well as time tested statistics. The first calander year would be devoted mainly to research and development of sample materials where ground truth and reliable intelligence is available and/or the development thereof. The second year would be used to establish check, and refine, techniques as well as making preliminary estimates of yields in countries of interest as designated by the intelligence community. By the third agricultural season NPIC would have at least 3 highly trained agricultural specialists who would provide correlated, related, report data as specified by the community as well as provide training to additional analysts, as appropriate.

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ATTN: [redacted] 25X1A

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SUBJECT

"Response to Internal Requirement
Under NPIC Project No. 99738-6"

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